OHANA DRONE
Unmanned Aircraft System (UAS)
Flight Operations and Procedures Manual (FOPM)

Document Version 1.1 - Last Modified: February 14, 2022

Revision History

Update and Amendment Procedures to the FOPM

All updates and / or amendments that are to be made to the FOPM will be promulgated and approved by the PIC. They will be issued to each holder of an official FOPM version / copy.

Each issuance of an update / amendment will include a summary of each and every change, with a detailed explanation, as well as the newly numbered pages that will need to be inserted / replaced in each manual.

Each official manual holder will be responsible for updating their manual with each update/amendment per the instructions issued.

Any discrepancy discovered during the issuance and update process will immediately be brought to the attention of the PIC. The holders of the FOPM will provide verification of revision inclusions via return email that acknowledges both receipt and completion of revision as instructed.

List of Official FOPM Holders

Copy #	**Person Responsible**	**Role**	**Location**
MASTER			
Copy #1			
Copy #2			
Copy #3			
Copy #4			
Copy #5			
Copy #6			

Tracking #	**Date Issued**	**Title**	**Description**
1.0	11/30/2021	Original	1st version issued post final-review
1.1	02/14/2022	Revision	Added Appendix A, night time operations and Appendix B, multiple aircraft operations.

Reference Documents

14 CFR	Title 14 Code of Federal Regulations
49 CFR 830	Notification and Reporting of Aircraft Accidents or Incidents and Overdue Aircraft, and Preservation of Aircraft Wreckage, Mail, Cargo, and Records
FAA Order 8900.1 Vol. 16	Unmanned Aircraft Systems (UAS)
FAA Order 7110.65 (as amended)	Air Traffic Control
FAA Order 8000.369 (as amended)	Safety Management System
FAA Order 8020.11 (as amended)	Aircraft Accident and Incident Investigation and Reporting
FAA Order 8040.4(as amended)	Safety Risk Management Policy
FAR/AIM	Federal Aviation Regulations/Aeronautical Information Manual

Flight Operations and Procedures Introduction

PURPOSE

The OHANA DRONE FOPM applies to all Unmanned Aircraft Systems (UAS) flight operations conducted by OHANA DRONE personnel operating in designated locations in accordance with FAA Certificate of Authorization (COA) requirements. This manual is an official document of OHANA DRONE.

This manual is not intended to be all inclusive but is instead a supplement to the Code of Federal Regulations (CFR), FAA Regulations, and State and local laws as well as the approved exemption to conduct Unmanned Aircraft Systems (UAS) operations allowed by special authority for certain UAS. Title 49 U.S.C. § 44807, and 14 C.F.R. Part 11.

In additional to the FOPM, all UAS operations will be conducted in accordance with (IAW) the OHANA DRONE, aircraft operating manuals. Aircraft will be operated in a flight ready condition at all times and aviation personnel are expected to utilize sound, conservative judgment in their approach to their duties. The policies and procedures contained within this manual are intended to promote safe, efficient, and lawful operations of OHANA DRONE UAS. Safety, above all other considerations, is the primary objective.

INITIAL AIRWORTHINESS REVIEW

In accordance with the statutory criteria provided in 14 CFR part 107, and in consideration of the size, weight, speed, and limited operating area associated with the aircraft and its operation, OHANA DRONE expects no adverse safety affects to participating or nonparticipating individuals compared to a manned aircraft that holds a standard airworthiness certificate performing a similar operation.

OHANA DRONE has an established inspection and maintenance program for the continued airworthiness of the aircraft in accordance with the manufacture’s maintenance, overhaul, replacement, inspection and life limit requirements for the aircraft and aircraft components.

OHANA DRONE Organization

KEY PERSONNEL AND RESPONSIBILITIES

The following paragraphs define the functions, responsibilities, and authority of key personnel within OHANA DRONE's UAS Department. Note that in some cases, two or more roles may be embodied by the same person. This is only allowed where standard checks and balances are not required to be satisfied using different personnel.

PILOT IN COMMAND (PIC)

The Pilot-in-Command (PIC) is accountable for the safe conduct of assigned flights. One PIC must be designated, at all times, and must have been designated as PIC before or during the flight. The PIC is responsible for the UAS flight operation as described under 14 CFR § 91.3.

The PIC shall have successfully completed the training and qualification process as specified in the OHANA DRONE, User's Manual. PIC qualification flight hours and currency will be logged in a manner consistent with 14 CFR § 61.51(b). Duties include, but are not limited to:

a. checking weather and all applicable NOTAMs where available;
b. determining the aircraft weight and balance IAW payload and airframe requirements;
c. ensuring that all flight planning requirements have been met;
d. ensuring that the aircraft is duly registered and that the documentation is available for inspection at the Ground Control Station;
e. ensuring that aircraft crew members have valid licenses, medical certificates and passports and visas if required, and are qualified for the mission to be flown;
f. completing an aircraft pre-flight inspection before each departure;
g. briefing the crew members;
h. operating the aircraft in accordance with operator procedures and aircraft limitations IAW the aircraft operators manual;
i. completing all post flight duties and recording flight times and aircraft defects.

PIC AUTHORITY

The PIC of a flight is directly responsible for, and is the final authority as to the safe, effective, operation of the aircraft and the well-being of the crew (Ref 14 CFR part 91.3). Deviation from specified flight and operating instructions is authorized

during an in-flight emergency situation, when in the judgment of the PIC, safety justifies such action.

Responsibility for starting or continuing flight with respect to weather or any other condition affecting the safety of the aircraft rests with the PIC. The PIC is vested with the final decision regarding the aircraft's airworthiness and safe conduct of the flight. In the case of a mishap to an aircraft, the PIC is responsible for its safe custody until the aircraft has been taken into custody by proper authority IAW National Transportation Safety Board (NTSB) Title 49 Subtitle B Chapter VII Part 830 and all other FAA requirements.

VISUAL OBSERVER (VO)

All OHANA DRONE flight operations will utilize a VO. The VO may be used to assist in the Visual Line of Sight (VLOS) requirement so long as the PIC always maintains VLOS capability. The VO and the PIC must be able to communicate verbally in some manner, at all times**.** The VO must be positioned to assist the PIC, to exercise the see-and-avoid responsibilities required by §§ 91.111, 91.113, and 91.115 by scanning the area around the aircraft for potentially conflicting traffic and assisting the PIC with navigational awareness. Visual Observers:

- Are required for all operations.
- Must have a thorough understanding of FAA regulations for the airspace where the UAS will be operating.
- Must be responsible for only one UAS at a time.
- Must maintain immediate communication with the UAS pilot, at all times. The observer must also monitor the appropriate ATC frequency when required, to enhance situational awareness.
- Must assist the PIC with maintaining the UAS within VLOS.
- Must be in position to observe the aircraft and the surrounding airspace to assist the pilot in determining:
  - The UAS's proximity to other airborne assets (participating and non-participating aircraft) and physical hazards (towers, structures, weather).
  - Prevent the UAS from becoming a collision hazard.
- Must inform the PIC prior to losing visual contact.
  - This is based on the VO's normal vision, however, corrective lenses, glasses, and contact lens are allowed. Binoculars, telephotos lens, night vision goggles, and field glasses are allowed as augmentation devices, but cannot be used as the primary means of visual contact.
- All supported operations will be conducted in Visual Metrological Conditions (VMC).
- Be trained in:

- Crew Resource Management (CRM), FAA AC 120-51 or accepted equivalent.
  - The observer must bring any information that has an impact on operational safety and/or the safety of the mission to the attention of the PIC. The observer should convey the information clearly, giving appropriate detail in a concise, organized manner, and to state recommendations as appropriate. The observer should be prepared to respond to questions and ask questions if needed to clarify any instructions given by the PIC.
- Applicable sections of CFR 14 (91.111, 91.113, 91.115, and 91.155).
- ATC and pilot radio phraseology.
- Applicable sections of the Aeronautical Information Manual (AIM).

OTHER FLIGHT CREW

Ancillary personnel such as sensor operators or other specialists must be thoroughly familiar with and possess operational experience of the equipment being utilized in accordance with the operator's manual.

Pilot Certification and Currency

LICENSING AND PILOT CERTIFICATION

The FAA recognizes UAS as an aircraft within the definition of 14 CFR part 1.1. Generally, all aircraft are required to be operated by a Pilot in Command certificated under 14 CFR part 61, Certification; Pilots and Flight Instructors. Part 61 prescribes the requirements for issuing pilot certificates and ratings, the conditions under which those certificates and ratings are necessary, and the privileges and limitations of those certificates and ratings. Accordingly, OHANA DRONE procedures will comply with all FAA regulations and procedures regarding pilot certification and licensing criteria.

This section describes certification and licensing requirements of all flight crewmembers, including visual observers, to ensure compliance with FAA regulations and safety policies and procedures.

Operations for aircraft over 55 lbs. will be conducted under 14 CFR part 91, rather than under part 107. In general, part 91 is predicated on the presumption that the pilot in command conducting an operation under part 91 holds an airman certificate under part 61. As a result, the FAA has determined granting exemption from the requirement of § 61.3(a)(1)(i) to require a person holding a remote pilot in command certificate (with the appropriate training and demonstration of knowledge and skills required by this exemption) to conduct the operations to which the exemption applies will ensure clarity.

The statutory obligation for an airman certificate is codified at 49 U.S.C. § 44711(a)(2). Pilots who conduct operations under an exemption with a remote pilot in command certificate would comply with § 44711(a)(2), as the FAA described in the Operation and Certification of Small Unmanned Aircraft Systems final rule (81 FR 42064, 42088-89 (June 28, 2016).

The general requirements for all airmen include: eligibility, aeronautical knowledge and Transportation Security Administration (TSA) vetting. Given that the operation would occur only after airmen who hold a current remote pilot in command certificate have received specific training, have visited the area of operation and are fully capable of using the tools available to prepare for the operation, conduct comprehensive preflight actions, and conduct the operation only in a limited geographical area, the FAA has previously determined that a remote pilot certificate issued under 14 CFR part 107 provides the FAA sufficient assurance of the pilots' qualifications and abilities to perform the duties related to the operations authorized under their exemption. The remote pilot in command certificate confirms the petitioner's eligibility, secures TSA vetting, and ensures

the PIC has the requisite aeronautical knowledge for operating the UAS within the NAS.

14 C.F.R. PART 107 REQUIRMENTS

Also, for 14 C.F.R. Part 107 (Part 107) operations, in accordance with 14 C.F.R Part 107.12, OHANA DRONE requires that no person may act as a remote pilot in command unless that person has a remote pilot certificate with a small UAS rating.

PIC REQUIREMENT

One PIC must be designated and must have been designated as PIC before or during the flight. The PIC is responsible for the UAS flight operation as described under 14 CFR § 91.3.

PIC qualification flight hours and currency will be logged in a manner consistent with 14 CFR § 61.51(b). The requirements of 14 CFR part 91.17, Alcohol or Drugs, also applies to the PIC and all other UAS crewmembers.

CURRENCY REQUIREMENTS

Through its robust training program, which requires aeronautical knowledge, experience, and flight proficiency beyond that required by Part 107, OHANA DRONE will be able to achieve a level of safety equivalent to what would be obtained using a PIC holding a manned pilot certificate under Part 61.

OHANA DRONE has integrated safety elements into the operation of its UAS, including comprehensive pilot and VO training and certification requirements that establish an equivalent level of safety to operations conducted with a PIC that holds a manned pilot certificate. These requirements include: a comprehensive UAS training course, which includes theory and practical components, a pilot theory exam, supervised flight training, including agricultural spraying, completion of OHANA DRONE training and examination program requirements, minimum flight time requirements, demonstrated practical flying ability for the relevant tasks, and continued periodic training after certification.

All OHANA DRONE PICs must provide documentation showing they maintain an appropriate level of recent pilot experience in the UAS being operated. At a minimum, the PIC must have logged at least 20 hours of total flight time of a multi-rotor system as the PIC with at least 10 take-off and landings within the previous 90 days.

The PIC, to exercise the privileges of their title will have flight reviews and maintain recent pilot experience.

FAR § 61.127 contains flight proficiency requirements for specified aircraft categories. Part 107 contains no flight proficiency requirements, however, to ensure adequate flight proficiency, OHANA DRONE will require demonstrated multi-rotor proficiency in:

- Preflight preparation;
- Preflight procedures;
- Airport and heliport operations;
- Hovering maneuvers;
- Takeoffs, landings, and go-arounds;
- Performance maneuvers;
- Navigation;
- Emergency operations;
- Special operations; and
- Postflight procedures.

CURRENCY EXPIRATION

If 90 days has elapsed since the PICs last flight, the PIC must regain currency by reviewing normal and emergency procedures and UAS vehicle limitations. A letter documenting the required review above will be posted in the PIC's Aircrew Training Record. The PIC must perform one takeoff and one landing to standards in order to regain currency. If 180 days have elapsed since currency expiration, the UAS pilot must complete a re-currency checkout program.

The PIC may designate surrogate UAS vehicles of similar performance and handling qualities to meet the take-off and landing currency requirement for specific UAS vehicles.

Medical Considerations

PHYSICAL EXAMINATION DOCUMENTATION

Aircrew members must have optimal physiological and psychological fitness in order to perform their duties safely and efficiently.

For operations over 55 lbs., the PIC must also hold at least a current FAA second-class airman medical certificate. The PIC may not conduct the operation if he or she knows or has reason to know of any medical condition that would make him

or her unable to meet the requirements for at least a second-class medical certificate, or is taking medicine or receiving treatment for a medical condition that results in the PIC being unable to meet the requirements for at least a second-class medical certificate.

The VO or any other direct participant may not participate in the operation if he or she knows or has reason to know of any physical or mental condition that would interfere with the safe operation of the aircraft.

Aircrew members will immediately inform the PIC when they have participated in activities or received treatment for which flying restrictions may be appropriate. This includes exposure to any exogenous factors as well as any treatment or procedure performed by a non-flight surgeon

ALCOHOL OR DRUGS

The requirements of 14 CFR part 91.17, Alcohol or Drugs, applies to all UAS crewmembers.

ANTI-DRUG AND ALCOHOL MISUSE PREVENTION PROGRAM

OHANA DRONE reserves the right use an approved Alcohol and Drug Program which is in accordance with 14 CFR Part 120. This program is designed to help prevent accidents and injuries resulting from the use of prohibited drugs or the misuse of alcohol by employees who perform safety-sensitive functions in aviation. The program is administered in compliance with 14 CFR Part 120, Subparts E and F. The Branch Manager retains oversight of this program and responsibility for overall compliance with FAR Part 120.

POST ACCIDENT/INCIDENT

If an aircrew member's performance either contributed to an accident or cannot be completely discounted as a contributing factor to an accident, they will be tested as soon as possible but not later than 32 hours after the accident for drugs, and 8 hours for alcohol.

Crew Resource Management (CRM)

CREW RESOURCE MANAGEMENT

The goal of OHANA DRONE's UAS program is to provide safe, efficient, consistent, and reliable utilization of aviation assets for the public. The aircrew members and observers are uniquely positioned and qualified to ensure that these goals are met for each and every flight. Experience has shown that a well-managed flight deck/cockpit environment, including the timely and correct exchange of information between crewmembers and the proper accomplishment of their appointed tasks, serves as one of the most effective methods by which operational safety can be enhanced. All UAS crewmembers will be trained in CRM and the PIC will ensure that all aircrew members integrate crew risk management. The current edition of FAA AC 120-51, Crew Resource Management Training, or recognized equivalent, is applicable.

STERILE COCKPIT

During critical phases of flight, no crewmember may perform any duties not required for the safe operation of the aircraft. No crewmember may engage in, nor may any PIC permit, any activity during a critical phase of flight, which could distract any crewmember from the performance of his/her duties or interfere in any way with the proper conduct of those duties.

DECISION MAKING AND COMMUNICATIONS

Well-defined role structure reduces ambiguity and enhances each aircrew member's performance. The PIC is the final decision-making authority regarding the aircraft, but it is the responsibility of all crewmembers to contribute to the decision-making process to ensure that the best decisions are made through advocacy and assertion. Conflicts and doubts about safety related issues must be resolved promptly. The PIC is expected to use their exigent authority if necessary, to ensure the safety of aircraft, crew, or cargo. Safety is paramount and cannot be compromised.

NOTE: Although CRM principles prescribe that some cockpit decisions can be made by crew consensus, others, including the go-around callout, require immediate action, without question, because of the immediacy of the situation.

CREW ENDURANCE MANAGEMENT

All aircraft crewmembers are expected to manage their personal time so as to be well rested when they report for work. OHANA DRONE pilots will observe the flight and duty time limitations as described in this section and shall not work

when fatigued. Should operational contingencies require an extension of these limitations, such an extension may only be granted by the Director.

AIRCREW DUTY AND REST LIMITATIONS.

The crew rest period is the non-work period immediately preceding the crew duty period. This period shall be a minimum of 12 hours with at least 8 uninterrupted hours allowed for sleep. The following crew duty period restrictions apply to all crewmembers/non-crewmembers:

(1) The crew duty period begins when an individual reports for work, (either flight or administrative duties), and ends when the engines are stopped at the end of a mission or series of missions.

(2) The basic crew duty period shall not exceed 12 consecutive hours. The Director is authorized to grant extensions to the basic crew duty period on a case-by-case basis.

(3) Crewmembers must be afforded at least 10 consecutive hours of rest during the 24-hour period that precedes the planned completion time of the duty assignment

(4) OHANA DRONE aircrew are advised to exercise the “no-vote” (an election not to fly) when medically unfit to fly for any reason.

Safety Management Approach

POLICY

All OHANA DRONE flight operations will be conducted in accordance with safety management approach established in this manual. This section contains an overview of the approach and methodologies that will be applied to UAS operations by OHANA DRONE. The degree to which all of the included methods may be applied is dependent, in part, on previous usage desired by the operator. All personnel will ensure implementation of the Safety Program and are responsible for the prevention of mishaps.

SAFETY MANAGEMENT

The OHANA DRONE Safety Management System (SMS) is an organized approach to managing operational safety risks to assure that an acceptable level of safety is achieved and maintained. The SMS principles contain four critical components:

- Safety Policy
- Safety Risk Management
- Safety Assurance
- Safety Promotion

Initially, all hazards will be identified and analyzed with associated probabilities and likelihoods. By using the methodology and scalability of safety management systems practices and industry, standard guidance documents such as FAA Order 8040.4A, confidence will be enhanced that key system vulnerabilities have been identified, proposed safeguards exist and are adequate for the vulnerability, or that the deficiencies or inadequacies of the proposed safeguards have been recognized and mitigated to an acceptable level of safety.

Once gathered, completed safety case information will be evaluated for final Go/No-Go approval.

SMS RISK MANAGEMENT EVALUATION

A completed and reviewed Safety-Risk Profile is required for all OHANA DRONE flights. The Safety-Risk Profile is a map that charts the ‘contours’ of higher risk. It is the basis on which the SMS is developed, implemented and evaluated. The goal of the risk management criteria is to ensure system hazards that may affect safety are recognized and have control measures available. For the risk management criteria to be met, the following conditions should be satisfied:

- Hazards identified
- Hazards assessed
- Control measures and risk decisions
- Hazard controls
- Supervision and assurance

The following risk assessment matrix includes a systematic approach to process improvement that requires proactively searching for opportunities to improve the process at every step and not simply to identify deficiencies after an undesired event.

Severity / Likelihood	Minimal 5	Minor 4	Major 3	Hazardous 2	Catastrophic 1
Frequent A	[Green]	[Yellow]	[Red]	[Red]	[Red]
Probable B	[Green]	[Yellow]	[Yellow]	[Red]	[Red]
Remote C	[Green]	[Green]	[Yellow]	[Yellow]	[Red]
Extremely Remote D	[Green]	[Green]	[Green]	[Yellow]	[Red] / [Yellow]
Extremely Improbable E	[Green]	[Green]	[Green]	[Green]	[Yellow]

High Risk [Red]
Medium Risk [Yellow]
Low Risk [Green]

* High Risk with Single Point and/or Common Cause Failures

PROXIMITY AND RISK MANAGEMENT

The OHANA DRONE may employ two different methods of protecting persons and property within or around the operations area, based upon a containment method and a probabilistic method. Both will be explored together in determining control measures and risk decisions.

- Containment method will be within low-density sterile airspace and may include mitigations such as altitude, geographical, and propulsion restrictions. The overall goal in containment methodology is to contain 100% of the UAS failure debris within this controlled area in the event a mishap occurs.

- Probabilistic Risk Assessment (PRA) is the process by which probability and severity of the hazards are defined for a specific test. This results in a subjective expression of risk and is a structured and logical analysis aimed at identifying and assessing risks in complex technological systems. For example, the purpose of a PRA might include identifying and assessing Near Mid-Air Collision (NMAC) risk. The results provide an estimate of mission outcome likelihood and encounter probability with casualty expectation with other users of the airspace while the UAS is flying in a particular volume of airspace. Based on available design data, the process could identify major risk contributors rather than all possible risk contributors and apply estimates for those major hazard likelihoods to a set of scenarios. An example of an objective would be to estimate the probability that the UAS will successfully transit the proposed volume of airspace without encountering another aircraft within the predetermined NMAC criteria (500 ft lateral radius, ±100 ft vertical separation). The PRA process would use operational and functional system performance estimates, and their associated hazards, to evaluate the ability to mitigate risk.

CRITERIA FOR RELIABILITY AND ADEQUACY OF SAFEGUARDS

There must be evidence to show that required safeguards will mitigate critical hazards. Safeguards must be provided if the hazard analysis requires it or if the UAS operation does not meet other safety criteria (e.g., casualty expectation, property damage, collision avoidance) without it.

Typical systems that may be considered as safeguards include, but are not limited to:

- Emergency remote pilots
- Flight termination systems
- Software "fly home" routines
- Fuel or battery limitations

RISK MITIGATION

Mitigating procedures are necessary to safely organize, plan, and implement operations of UAS. The following are examples of some mitigating factors to allow UAS operations based on particular capabilities, limitations, and safety considerations:

Mitigating Factors

1. Altitude Restricted
2. Fuel Restricted
3. Geographically Restricted
4. Personnel Restricted Areas
5. Single Operation
6. Pilot Experience

SYSTEM CONSIDERATIONS FOR UAS

The chosen OHANA DRONE UAS system provides redundancies and independent functionality to ensure the overall safety and predictability of the system. A Flight Termination System (FTS) that can be activated manually by the UAS PIC is also required. The FTS provides the necessary action to immediately end the flight of the UAS.

Flight Planning and General Operating Requirements

FLIGHT SCHEDULING AND PLANNING

Scheduling missions must take in account aircrew qualifications, proficiency, fatigue management policies, maintenance needs of the UAS, and other scheduling conflicts caused by training, weather, and transportation to and from the mission locations. The PIC is responsible to ensure that all flight planning documents have been prepared and filed prior to departure. When required, the PIC shall also ensure FAA requirements have been met.

NOTAM REQUIREMENTS

OHANA DRONE will file a NOTAM for each flight no more than 72 hours, but no less than 24 hours prior to each flight with the appropriate agency.

FLIGHT PLANNING REQUIREMENTS

Before commencing a flight, UAS flight crews will become familiar with all available information concerning that flight in accordance with 14 CFR 91.103. The PIC will evaluate aircraft performance, departure, en route and approach data, NOTAM, and appropriate FLIP or DOD publications to ensure the flight can be conducted safely and IAW all applicable regulations.

The PIC is responsible for flight planning and related logistics information (i.e. ground transportation, servicing requirements, reservations, etc.). He/She may assign this duty to the other pilot but retains the responsibility for the task.

The PIC shall not commence a flight unless it has been ascertained that the facilities available and directly required for such flight and for the safe operation of the aircraft are adequate. Additionally, all required permissions and permits will be obtained from territorial, State, county or city jurisdictions, including local law enforcement, fire, or other appropriate Governmental agencies.

The PIC shall also be familiar with all available meteorological information appropriate to the intended flight. Preparation for every flight shall include:

- Review of available current weather reports and forecasts; and
- Planning of an alternative course of action to provide for the eventuality that the flight cannot be completed as planned because of weather conditions.

FLIGHT CREW CHECK-IN AND POST-FLIGHT PERIOD

Flight crewmembers shall check-in for flights no less than one hour prior to the scheduled departure time. An earlier check-in time may be designated by the PIC when, in his/her judgment, the conditions warrant additional time prior to departure.

The post-flight period is assumed to be 30 minutes.

BACKGROUND INFORMATION

The PIC and flight team will review the location of the operation for the day. They will brief as a team 1 hour before the flight operation. Items to review are:

- Airspace
- Weather
- Flight Plan
- Mission
- Takeoff-Landings
- Safety Review
- Post Flight Activities

WEATHER

Prior to each flight, the PIC will obtain aviation weather reports and forecasts and analyze the following data to determine the effect on the proposed operations:

- Latest NOTAM for point of departure, route of flight, destination and the alternate destination;
- Surface weather observations for flight location;
- Forecasts for all flight location;
- Reports or forecasts of severe weather, turbulence or icing which could affect the proposed flight;
- Any known air traffic delays.

Pilots will check weather forecasts sufficiently in advance of a proposed flight of any conditions that may affect schedules. This includes checking weather forecasts the night before an early morning scheduled departure. The PIC may delegate some of these duties; however, he/she maintains overall responsibility.

FLIGHT WEATHER PLANNING AND LIMITATIONS

Weather limitations and alternate requirements for each flight will be considered. For all OHANA DRONE operations, the weather conditions at scheduled launch time, and plus or minus one hour of scheduled recovery time, shall be no lower than 1500-foot ceiling and 3 statute miles visibility as observed from the nearest official

government weather station. Flight in "Special VFR" is not allowed. If the PIC determines the environmental conditions are unsafe, the operation will be suspended.

Flights will not be operated less than 500 feet below or less than 2,000 feet horizontally from a cloud or when visibility is less than 3 statute miles from the PIC.

FORECASTED WEATHER

(a) *VFR flight.* Destination weather must be forecast to be equal to or greater than VFR minimums at estimated time of arrival (ETA) through one hour after ETA.

Note. When there are intermittent weather conditions, predominant weather will apply.

(c) *Area forecast.* If there is no weather reporting service, the PIC may use the area forecast.

(d) *Weather briefing.* A weather briefing is recommended. The weather brief is valid for 90 minutes unless the UAS has departed. The weather brief includes, but is not limited to:

(1) Launch/recovery site - current and forecasted ceiling, visibility, surface wind direction and speed (knots), icing, turbulence, and any significant weather systems in the launch/recovery area.

(2) Enroute- current and forecasted ceiling, visibility, temperature, wind direction and speed (knots) aloft at applicable altitudes, icing, turbulence, and any significant weather systems in the flight operations area.

Whenever possible, weather updates should be received within 30 minutes of takeoff and several more times throughout the mission, depending on the weather patterns and probability that the weather will change. The PIC makes final weather decisions for launch and/or recovery.

SEVERE WEATHER

Flights into known forecasted severe weather will not be authorized, including extreme or severe turbulence, thunderstorms, or in any area experiencing local effects from thunderstorms (i.e. gusting winds, lightning, rain, hail).

WIND LIMITATIONS

Wind limitations established within aircraft manufacturer's Operating Manual will be adhered to. These limitations consider maximum winds for flight, maximum crosswind conditions for takeoff and landing, and maximum gust or turbulence

conditions for adequate flight control and data gathering and the effect of the wind on power consumption while conducting the operation.

FROST, SNOW AND ICING

No pilot will attempt a takeoff if the aircraft has frost, snow, or ice adhering to any batteries, motors, rotors, control surfaces or other areas that could affect flight characteristics or performance. Aircraft that are found to have frost, snow or ice accumulations must be de-iced prior to flight. If existing conditions could cause accumulations to reoccur, the PIC must ensure that the aircraft is deiced as often as necessary for safe flight. Flight must not be attempted into known or forecast icing conditions.

FLIGHT LOG

A flight log will be used to detail flight data and all flight information that observed from the flight.

RECORDS AND DATA LOGS

Records for each flight will include all pre-flight checklists, risk assessment worksheets, mitigations identified and implemented, pilot reports, and post-flight debrief. Data taken during flight mission will be cataloged and recorded according to the prevailing regulations and laws of the state of operation. Flight data recording will be saved and assessed for safety implications, efficiency adjustments, and privacy protection.

REQUIRED DOCUMENTATION FOR EACH FLIGHT

All required authorizations and applicable OHANA DRONE manuals will be maintained in the Aircraft Folder and located at the GCS.

OPERATING SITE LOCATION ASSESSMENT

OHANA DRONE will have an accompanying Blanket Area Air Traffic Organization (ATO) issued Certificate of Waiver or Authorization (COA) prior to conducting any operations. Prior to each Part 107 flight and IAW COA requirements, an assessment of each operating location will be performed to include the following:

- Examine take-off and recovery points. If conditions are unsatisfactory, alternate sites will be identified and examined in the interests of safety.
- Weather conditions for the operating site.

- Air traffic operations in the area shall be assessed for their potential impact on the overall mission.
- Obstructions or other hazards not previously identified shall be assessed for their potential impact on the operation prior to flight.
- Flight boundaries will be verified.
- Deviations from the flight boundaries will be coordinated with the appropriate authorities.
- Maximum flight altitude will be set IAW the COA and will be briefed to all participants prior to flight and recorded.

FLIGHT OPERATIONS

OHANA DRONE UAS will be flown in pre-approved areas IAW with FAA guidance. The specific area of operation will be physically examined by OHANA DRONE personnel prior to flight using all means available to ensure all personnel not associated with flight operations are clear of the flight operations area. The use of the VO will also be utilized for operations over 55 lbs. as an additional safety mitigation, but the aircraft will remain within VLOS of the PIC at all times.

All precautions for safe flight will be undertaken, to include but not limited to: sterilization of takeoff and landing zones, checking of perimeter to identify un-known hazards or personnel within the operation area, noise level check to address potential impact on communications and distraction assessment awareness.

FREQUECNCY MANAGEMENT

OHANA DRONE aircraft will operate in the unlicensed band of 2.4 gigahertz (GHz), and within the 900 MHz bandwidth for its laptop ground station link. The system will also incorporate basic electromagnetic interference (EMI) and electromagnetic compatibility (EMC) design considerations.

The use of electronic devices (including cell phones) other than for UAS flight- and mission-required usage is governed by § 91.21, which ensures these devices do not interfere with the UAS systems.

INTER-COMMUNICATIONS REQUIREMENTS.

Any VO, sensor operator, or other person charged with providing see-and-avoid assistance must have immediate direct voice communication with the UAS pilot. Unless it is approved for others to do so, the UAS PIC or designee are the only crewmembers that will communicate with ATC. However, at a minimum OHANA DRONE will ensure other UAS crewmembers have the capability of

monitoring ATC frequencies when necessary, for shared situational and navigational awareness.

OBSERVER REQUIREMENT.

All OHANA DRONE flight operations will utilize a VO for operations over 55 lbs. and the VO may be used to assist in the VLOS requirement as long as the PIC always maintains VLOS capability. The VO and the PIC must be able to communicate verbally at all times**.** The VO must be positioned to assist the PIC, to exercise the see-and-avoid responsibilities required by 14 C.F.R. §§ 91.111, 91.113, and 91.115 by scanning the area around the aircraft for potentially conflicting traffic and assisting the PIC with navigational awareness.

The responsibility of ensuring the safety of flight and adequate visual range coverage to avoid any potential collisions remains with the PIC. The PIC for each UAS operation must identify a location from which the observer will perform his/her duties. This location will be selected to afford the best available view of the entire area within which the operation is to be conducted.

FLIGHT OVER PEOPLE

OHANA DRONE UAS operations will avoid these areas. However, when flight in these areas is required for exigent circumstances, OHANA DRONE will support proposed mitigations with system safety cases that indicate the operations can be conducted safely. Additionally, OHANA DRONE will show that risk of injury to persons or property along the flight path has been mitigated.

DAY/NIGHT VFR REQUIREMENTS

All operations will be conducted under Visual Flight Rules (VFR) during Visual Meteorological Conditions (VMC) and during daylight conditions. The PIC must ensure that the available weather information indicates that the meteorological conditions along the planned route will permit flight under VFR. Flight operations will occur within the parameters of the blanket ATC approved COA. All altitudes reported to ATC will be in above ground level (AGL).

OPERATIONAL BOUNDARIES

All flight operations will be conducted IAW the limitations and restrictions listed within the Title 49 U.S.C. § 44807 approval and within the blanket COA requirements. In the event a OHANA DRONE operation is required to exceed the vertical limit imposed by the approval, a waiver for that altitude and operation will be obtained. All altitudes reported to ATC will be in AGL when required and any operations conducted within 5 nautical miles (NM) of the geographic center of a non-towered airport will obtain a Letter of Agreement with the appropriate airport

management and made available to FAA upon request. In addition, access to any property will be limited to persons associated with and necessary to flight operations.

Any UAS appearing uncontrolled or moving beyond the boundary limit will be subject to immediate manual override. Failure of manual override will result in immediate flight termination.

Geo-fencing logic will be utilized on all OHANA DRONE UAS, capable of restricting its operations to within pre-programmable flight boundaries. This may be accomplished by setting permanent geographical coordinate borders on the ground control station.

NON-ESSENTIAL PERSONNEL

OHANA DRONE aircraft will be operated to ensure a safe distance away from all participating and non-participating personnel. When required for safety, barriers or structures will be present that sufficiently protect nonparticipating persons from the UA and/or debris in the event of an accident. If a situation arises where nonparticipating persons leave such protection and are in an unsafe distance from the UA, flight operations must cease immediately in a manner ensuring the safety of nonparticipating persons.

Operations around vessels and vehicles may occur if the owner/controller of any vessels, vehicles or structures has granted permission for operating close to those objects and the PIC has made a safety assessment of the risk of operating closer to those objects and determined that it does not present an undue hazard.

UAS SECURITY

All OHANA DRONE personnel involved in flight operations will adhere to the following physical security measures:

a. During ground and flight operations, keep all operational stations continuously manned or secured to preclude tampering.

b. Only mission essential personnel will have access.

c. Leave no UAS unattended or unsecured at any time. Upon completion of a flight operation, return the aircraft to a secure area as soon as possible.

APPROACH AND DEPARTURE

A clear approach and departure path, consistent with aircraft shall be utilized.

TAKE-OFF AND LANDING SITES

An optimum location for a Take-off and landing site is one that is clear, flat, level, and with good divisibility. The PIC will use his/her best judgment when considering a potential take-off and landing site. A suitable landing site should be at a minimum, 20 x 20 ft.

Some factors that must be reviewed include:

- obstruction clearance
- ground slope
- environmental hazards
- clear visibility of the aircraft

MINIMUM LANDING FUEL-BATTERY RESERVES

The total flight time will be dependent upon historical atmospheric and payload information. The PIC and VO will use the total flight time as the safety information for the GCS and the applicable flight timers. Flights normally will be terminated IAW Manufacturer's recommended battery power reserve. Post flight, all batteries will be reviewed for voltage, power will be restored to batteries and total flight time logged and visual inspection of batteries will be conducted for any abnormalities.

Flight Operations Procedures

GENERAL

A PIC and a VO will be designated for each flight. The PIC tracks all currencies and qualifications of all crew that may be assigned flights. All OHANA DRONE operations will comply with all applicable:

1) Federal Aviation Regulations, laws, and rules
2) OHANA DRONE FOPM
4) Federal and State laws applicable to aviation operations
5) Aircraft operator's manuals and checklists

PIC FINAL AUTHORITY

The PIC assigned to each flight will have exclusive and final authority in accordance with FAR 91.3 as to whether or not the aircraft shall proceed to any destination or undertake any flight. The PIC shall not be overruled by any other person or executive, nor disciplined for well-considered decisions having to do with weather, mechanical condition of the airplane or other hazards. They should utilize all available resources in making decisions related to flight. The other crewmembers will, except when immediate action is required, be brought into discussions concerning the operation of the aircraft as it relates to weather, mechanical condition or other hazards. The PIC has the final authority on all decisions relating to the operation of the aircraft.

AIRCREW INFORMATION READING FILE

An Aircrew Information Reading File (AIRF) will be established to maintain continuity and pass along important platform-specific information that is not formally documented elsewhere. A general AIRF is maintained by all flight operations personnel while platform specific items will be contained within the Aircraft Folder.

AIRFIELD OPERATIONS AND PROCEDURES

The following procedures are required prior to flight operations.

1. Procedures for:
    a. Daily Notices to Airmen (NOTAMS)
    b. Obtaining weather information
    c. Receiving High Intensity Radio Transmission Areas (HIRTA) briefing when required.
    d. Verify Schedule
2. Obtain medical facilities/frequencies/phone numbers

3. A review of airspace in the local area
4. A review of the local area map, to include:
    a. Boundaries
    b. Flight corridors
    c. Reporting points
    d. Airfield or launch area security
    e. Noise abatement procedures
    f. Prominent terrain features
    g. Obstacles or hazards to flight
    h.. Tactical training and range area maps
    i. Restricted area, HIRTA, and no-fly areas
    j. Airfields
5. Complete Pre-flight inspection

PRE FLIGHT BRIEFING

The crew briefing is the last formal briefing and presentation prior to the actual UAS flight. This briefing will be conducted by the PIC flying the mission. The intent is to cover all operational aspects of the mission and to promote full understating among all participants. The following personnel shall attend a UAS flight crew briefing:

- All required UAS flight crewmembers (i.e. PIC, VO and any other crewmembers assigned),
- Any OHANA DRONE mission essential personnel that will be within the authorized geographic flight operations area,
- Other personnel deemed necessary for proper mission planning and execution.

Briefing formats shall cover the following information:

- Weather; Special factors influencing this takeoff .
- Operation flight plan/flight profile; verify the flight velocity, verify the GPS waypoint boundaries.
- Mission rules / limitations / Go and No-Go Criteria; verify any potential hazards, or flight obstacles
- Aircraft Status
- Crew Status
- Crew coordination items
- Risk Assessment
- Emergency Procedures
- Landing power / battery charge

PIC will complete the briefing by asking, “Does anyone have anything to add? “

PRE-FLIGHT/POST-FLIGHT INSPECTIONS

PICs are responsible for conducting both pre-flight and post-flight inspections of the airframe and GCS, looking for any changes in the system overall IAW with the manufacturer's procedures.

PRE-FLIGHT INSPECTION

All aircraft shall undergo a pre-flight safety inspection IAW the manufacturer's pre-flight procedures. Pre-flight checks are to be accomplished by a PIC and all decisions of the PIC will be final.

If the inspection reveals a condition that affects the safe operation of the UAS, the aircraft will be prohibited from operating until the necessary maintenance has been performed and the UAS is found to be in a condition for safe flight.

AIRWORTHINESS ON FLIGHT LINE DETERMINATION (PIC)

The final responsibility for determining flight readiness of the aircraft rests with the PIC. In addition to completing a pre-flight check, the PIC shall thoroughly review the flight plan and satisfy himself/herself that the aircraft is in a flight ready condition. These responsibilities include but are not limited to ensuring:

- Compliance with all applicable pre-flight surface reviews/tests.
- Ensuring that the planned flight or series of flights will not exceed the time identified by the battery flight logs.
- Ensuring that all inspections, maintenance and limits have been carried forward and are not past due.
- Ensuring that any maintenance discrepancies have been corrected. Maintenance record entries shall be completed and signed by the PIC.
- Ensuring that the deferred items do not render the aircraft unsuitable for the planned flight or series of flights.

OPERATION OF FLIGHT CONTROLS

Only PIC and trained observers with completed airframe training may manipulate the flight controls of the UAS.

NOISE ABATEMENT

Pilots will adhere to published noise abatement procedures and voluntary curfews except when the safety of flight is involved.

AIRCRAFT BATTERY REPLACEMENT PROCEDURES

The PIC is responsible to ensure that all battery levels are of the proper voltage and quality and that the desired flight battery packs are attached to the vehicle prior to flight.

SHUTDOWN CHECKLIST

Prior to any pilot leaving any of the flight equipment (Aircraft or Ground Station) and shutdown, the PIC shall designate Shutdown Procedures with the post flight checklist. (See Accompanying Post-flight Checklist)

POST-FLIGHT CHECK (PILOT)

Post-flight inspection will be accomplished by PIC and observer with any other ground staff IAW checklist procedures.

POST-FLIGHT DEBRIEFING

Post-flight debriefings will be conducted to discuss general flight conduct, mission accomplishments and areas for improvement. The Post-flight briefing may be broken into two parts based on crew rest requirements: (1) an initial debrief conducted by the landing UAS flight crew to discuss UAS vehicle maintenance status and mission success, and (2) a final debrief conducted when all participating UAS flight crew are available to discuss overall mission conduct and lessons learned.

Emergency Procedures

RISK MITIGATION PLANS.

Contingency plans will be developed and detailed to mitigate the risk of collision with other aircraft and the risk posed to persons and property on the ground in the event the UAS experiences a lost link, needs to divert, or the flight needs to be terminated. OHANA DRONE takes into consideration all airspace constructs and minimizes risk to other aircraft by avoiding published airways, military training routes, Navigational Aids (NAVAIDS), and congested areas.

IN-FLIGHT EMERGENCY MANAGEMENT

The PIC should declare an emergency when any abnormal situation affects the safety of flight. When required, the PIC will notify local ATC of any in-flight emergency or aircraft accident as soon as practical. The PIC will notify ATC of any loss of control link as soon as practical. Loss of control link scenarios may be handled by ATC as an emergency. Management of the emergency will be well defined as to:

- who will fly the aircraft
- who will accomplish the checklist
- who will navigate and communicate with ATC

LOST LINK PLANNING

Lost link procedures at a minimum, will include:

- lost link route of flight,
- transponder use (if applicable)
- lost link orbit points,
- communications procedures, and
- pre-planned flight termination points in the event recovery of the UAS is not feasible.

POINT IDENTIFICATION

The OHANA DRONE pre-programmed emergency procedures incorporate contingency plans that address emergency recovery or flight termination of the UAS in the event of unrecoverable system failure. These procedures will normally include Lost Link Points (LLP), Divert/Contingency Points (DCP) and Flight Termination Points (FTP) for each operation.

LOST LINK POINTS (LLP)

LLPs are defined as a point, or sequence of points, where the aircraft will proceed and hold at a specified altitude, for a specified period of time, in the event the command and control link to the aircraft is lost. The aircraft will autonomously hold, or loiter, at the LLP until the communication link with the aircraft is restored or the specified time elapses. If the time period elapses, the aircraft may auto-land, proceed to another LLP in an attempt to regain the communication link, or proceed to an FTP for flight termination. LLPs may be used as FTPs. In this case, the aircraft may loiter at the LLP/FTP until link is re-established or battery exhaustion occurs.

DIVERT/CONTINGENCY (DCP) PROCEDURES

(1) A DCP or alternate landing/recovery site may be used in the event of an abnormal condition that requires a precautionary landing. Each DCP must incorporate the means of communication with ATC when required throughout the descent and landing (unless otherwise specified in the Special Provisions) as well as a plan for ground operations and securing the aircraft on the ground.

(2) For local operations, the DCP specified will normally be the airport/area used for launch and recovery.

EMERGENCY ASSUMPTION OF CONTROL

If there is any question that the UAS is no longer flying its programmed mission, the PIC will take manual control of the UAS and return it to the landing zone if able and land it under manual control. There may be minor problems that do not require emergency assumption of control. In these cases the PIC can direct an autopilot landing or manually land the aircraft.

LOST COMMUNICATION PROCEDURES

1. Loss of Communications between the Pilot in Command and Air Traffic Control

If required, the PIC will communicate with ATC through use of two way radio communications or a cellular phone based on the agreement between ATC and the PIC. In the event the PIC is unable to establish communications, the PIC will immediately land the UA until communications can be regained. In all cases, when

during Loss of Communications there is concern for people or property in the air or on the ground the PIC will immediately land the aircraft.

2. Loss of Communications between the Observer and the Pilot in Command

The PIC and Observer will be collocated during operations and communications will be through direct communication. However, if the observer and the PIC are not co-located where verbal communication is not possible, the following communication tools will be utilized….

-Hand held Police radio

-Voice actuated headsets

-Cellular phone

-Hand Signals (may be used solely or in conjunction with the communication equipment)

If communication is lost and cannot be re-established the UA will immediately land.

3. Between The UAS And GCS

If there is a temporary loss of control of the UAS due to a lost communication link with the GCS, the UAS will respond to the failsafe mode IAW design specifications established in the aircraft operator's manual. The PIC will perform the procedures identified in the operator's manual.

GPS FAILURE

If there is a GPS failure and the returning telemetry from the UAS indicates as such, the PIC will follow the procedures outlined in the aircraft operator's manual.

FLY AWAY

In the case of a fly away the pilot and flight crew shall make every effort to re-establish control of the UAS and land as soon as possible. Information on location, direction of travel, altitude, and expected vehicle behavior will be relayed to all appropriate authorities.

EMERGENCY FIGHT TERMINATION.

The authority for the activation of the FTS rests with the PIC. Situations for emergency flight termination include:

(1) The aircraft appears to be in uncontrolled flight and ground contact is imminent.

(2) The aircraft fails to respond to any data link commands.

(3) Any other emergency-situation the PIC deems necessary.

Mishap Procedures

ACCIDENT AND INCIDENT NOTIFICATION AND INVESTIGATION

The current edition of FAA Order 8020.11D, Aircraft Accident and Incident Notification, Investigation, and Reporting, and Title 49 of the Code of Federal Regulations (49 CFR) part 830, outlines reporting procedures for accidents and incidents involving civil aircraft and certain public aircraft. OHANA DRONE will follow the mishap reporting guidance and requirements set forth in NTSB Part 830, Notification and Reporting of Aircraft Accidents or Incidents and Overdue Aircraft, and Preservation of Aircraft Wreckage, Mail, Cargo and Records as applicable. All accidents and incidents involving fatalities, injuries, property damage, and fly-away by civil aircraft and those public aircraft subject to part 830 require FAA notification within 24 hours.

In addition, any incident, accident, or flight operation that transgresses the lateral or vertical boundaries of the operational area as defined by the applicable COA will be reported to the FAA's UAS Office within 24 hours.

An immediate investigation of the incident will be required, and when requested to do so the PIC is expected to provide copies of written aircraft accident/incident reports. Further flight operations will not be conducted until the incident, accident, or transgression is reviewed and authorization to resume operations is provided.

INJURY REPORTING

When a person is injured or involved in an accident during routine ground or flight operations, the priorities for those nearby are to get help, prevent further harm by checking and/or clearing the area, and applying first aid.

EMERGENCY RESPONSE PLANNING & RESPONSIBILITIES

An Emergency Response Plan (ERP) will be developed for each mission and will be known and briefed to OHANA DRONE personnel. The ERP will be part of every pre-mission briefing and should include environmental considerations, operational considerations, and authority contact information.

The following describes information contained within Emergency Response Plan:

1. Emergency Contact Information
2. Local Authorities and Locations of Emergency Supplies
3. Environmental Conditions Relevant to the Operation
4. A Primary and Secondary Emergency Location for Meet-up
5. Responsibilities specific to the mission for emergency – PIC, VO, Fire Containment

6. Resources on-hand (first aid kits, etc.)

The following are guidelines used in the development of the emergency response plan:

1. PIC should declare an emergency and land the aircraft as soon as possible as conditions allow.
2. Head to pre-determined emergency recovery as programmed within the mission planning software.
3. Contact emergency response authorities as soon as conditions allow.
4. Provide emergency support to authorities as needed, while remaining in contact with OHANA DRONE personnel and leadership.
5. Secure location and document any important information that will be helpful to emergency response crews and subsequent accident investigation IAW FAA and NTSB policies.

EMERGENCY RESPONSE PLAN

These Instructions will be used by OHANA DRONE personnel to respond to an identified aircraft mishap or accident. They will be posted clearly at each GCS to be used to report an emergency. The local phone numbers listed below will be filled in before posting.

1. PIC or designated person in charge ensure the safety of all personnel.
2. Report emergencies immediately IAW FAA and NTSB policies.
3. In the case of a UAS accident, the person managing the situation will:
   - Organize on-site assistance as necessary by contacting:
     - Medical Aid
     - Ambulance services
     - Fire Departments
     - Police
4. If all information is not available, do not delay reporting while information is being gathered.
5. Report by the fastest means available.
6. If at all possible, report by the most private means. For example, if you have to use a radio, provide only as much specific information as is absolutely necessary to ensure a rapid response to the emergency, (i.e. do not give names etc.).
7. Do not make any statements to the media. Media inquiries shall be directed to the Chief of Police.
8. Remember to keep calm and to act in a responsible, professional manner.
9. Keep communication lines clear for emergency purposes only.

10. Keep notes on all communications, observations and actions.
11. Ensure that the aircraft, its components and contents are not moved or otherwise disturbed, except to prevent destruction by fire or other cause, or to avoid danger to any person or property, without approval of the State civil aviation accident investigation authority in which the accident occurred.

If an accident occurred, the PIC will:

- Contact the accident investigation authority in the State that the aircraft accident occurred.
- Contact the appropriate ATC facility or Flight Service Station.

Telephone Numbers (to be completed at each GCS location):

Local Law Enforcement	
Hospital (closest)	
Fire Department	
Local FSDO	
FAA Regional Ops Center	
HQ Contact Number AFS-80	

General Aviation Safety

HAZARDS AND HAZARD REPORTS

One purpose of the Safety Program is to detect and eliminate hazards before they become mishaps. Reporting and examining close calls, unrealized exposures, and vulnerable situations via Hazard Reports increase safety and awareness. A hazards map for the local flying area will be generated and utilized to identify all potential hazards including HIRTA.

UNPREDICTED OBSTACLE

If there is an unpredicted obstacle that occurs during flight that either the PIC or VO identifies, the PIC will alter the mission flight plan or return the UAS to the landing zone and landing as soon as practicable, which ever can be accomplished in the safest manner as determined by the PIC.

DANGER ZONES

All OHANA DRONE operations require awareness of danger zones. No flight operations will occur in any designated danger zones.

BATTERY STORAGE

Only approved storage areas and containers for UAS batteries and any other hazardous material will be used. Charge and store aircraft batteries only in properly ventilated areas.

FOREIGN OBJECT DEBRIS /DAMAGE (FOD) PREVENTION.

1) All personnel performing duties on or around aircraft will:
2) Visually inspect areas adjacent to the aircraft and remove all potential FOD prior to operations.
3) Secure loose personal objects prior to working on the aircraft or otherwise engaging in flight operations.
4) Ensure that loose equipment are securely stowed prior to engine starts.
5) Ensure a “clean as you go” policy is enforced to remove potential FOD in the area associated with UAS operations. This includes all agencies connected with UAS operations.
6) All tools and equipment must be secured and inventoried prior to engine start and take off.

ENGINE RUN-UP

1) The PIC will ensure any maintenance or run-up areas are properly marked.

2) Before any run-up checks, the aircraft should be secured to an approved run-up area.

FIRE EXTINGUISHER

An appropriate fully serviced, properly marked and inspected, operational fire extinguisher will be kept readily available at all times.

APPENDIX A

Night-time Operations

PURPOSE

Ohana Drone is seeking relief from condition and limitation number 17. Number 17 states that:

17. UAS operations may not be conducted during night, as defined in 14 CFR § 1.1. All operations must be conducted under visual meteorological conditions (VMC). Operations may not be conducted under special visual flight rules (SVFR).

It is the night portion of condition and limitation Number 17 that Ohana Drone is seeking relief from in their accompanying petition. Ohana Drone's operations will require certain limited night operations and will be conducted during VMC conditions at all times. To expedite the FAA's safety assessment of the proposed relief sought, Ohana Drone has included a separate night-time operations safety case to accompany their petition.

PILOT IN COMMAND (PIC) AND VISUAL OBSERVER(S)

Ohana Drone will provide a method by which the remote pilot will be able to continuously know and determine the position, altitude, attitude, and movement of their UA.

Ohana Drone will assure all required persons participating in the UAS operation have knowledge to recognize and overcome visual illusions caused by darkness and understand physiological conditions which may degrade night vision. Ohana Drone will ensure one of more VO(s) are used during night-time flight operations. The VO and the PIC will maintain effective two-way communication and will coordinate with one another to scan the airspace where the UAS is

operating for any potential collision hazard and will both maintain operational awareness of the position of the UA.

All Pilots and VOs will be thoroughly trained in:

- Chapter 17, Aeromedical Factors of the Pilot's Handbook of Aeronautical knowledge, pages 17-22 through 17-29.
- All PICs and V0s must successfully complete (90%) the attached exam

When a night flight is scheduled, pilots and crew members should wear neutral density (N-15) sunglasses or equivalent filter lenses when exposed to bright sunlight during the day. This precaution increases the rate of dark adaptation at night and improves night visual sensitivity.

Crew members will comply with the IMSAFE checklist prior to flying at night.

- Illness – The will be no flight operations if any crewmember is experiencing any illness
- Medication – No flight operations will occur if any crew member is taking medications not approved by the FAA
- Stress – There will be no flight operations is any crew member is experiencing undue stress
- Alcohol – Will comply with the restrictions in 14 CFR Part 120
- Fatigue – All crew members will comply with the provisions of crew resource management and crew rest identified within this manual
- Eating – All crewmembers will ensure they've had time to eat and adequate meal and hydrate prior to night-time operations

AIRCRAFT SAFETY FEATURES

Only aircraft with position, altitude, attitude and movement direction metrics via either the controller, app, or on-screen display will be used during night-time operations. This information is provided visually to the user.

Aircraft Lighting - The chosen DJI Agras T-16 comes with mounted navigation lights in a standard configuration to indicate orientation and health. The T-16 has Long-range visible, high intensity LED lighting. DJI Agras offers high intensity LED lighting on the front three arms of the aircraft as well as aircraft status indicators on the rear three arms. Further, the use of highly visible

reflective paint or decals can also be used on the aircraft to increase conspicuity in order to facilitate rapid identification of the UAs.

This lighting will be utilized during night-time operations that can be seen at a minimum for a distance of 3sm and from the location of the pilot and/or VO(s). If the pilot and/or VO(s) losses sight of the aircraft, an immediate return to home event will be initiated.

Aircraft will always be operated, in a flight ready condition, and aviation personnel are expected to utilize sound, conservative judgment in their approach to their duties.

Ohana Drone also has an established inspection and maintenance program for the continued airworthiness of the aircraft in accordance with the manufacture's maintenance, overhaul, replacement, inspection and life limit requirements for the aircraft and aircraft components.

The Aircraft has onboard safety features to ensure the UAS can operate safely under both normal and emergency operating conditions. These features include automation to increase safety and reduce pilot workload. Some examples are the self-monitoring function (pre-takeoff diagnostics), a high-precision altitude control system, and redundant GPS flight control systems with geo-fencing and active obstacle avoidance. All applicable and redundant flight control safety features of the Aircraft are listed in the operations manual as well as provided in the attached Petition for Exemption.

GROUND STATION

The Aircraft ground control station includes a laptop/Tablet, and a Manual flight RC. The laptop/tablet lighting can be adjusted to a night, blue light filter to accompany better night vision.

When it is necessary to read checklists or manually operate the remote controller, a dim white light flashlight will be used or dim white headlight and will not be shined at any other VO or crewmember's eyes.

SITE SELECTION

Ohana Drone night-time operations will occur in a closed access environment over rural uninhabited, unoccupied, private or restricted-access land. These operating areas will always be owned or managed by the person or entity that is contracting with Ohana Drone to perform the aerial application and will be planned and approved in advance of the mission.

To avoid posing a risk to persons on the ground at night-time, Ohana Drone will only operate aircraft in that controlled and limited footprint with controlled access and barriers/protection for nonparticipating persons. The operating area will be illuminated so that the operator and VO can see any persons on the ground, and obstacles. However, Field illumination lighting will be kept as low as possible so that the light does not monopolize night vision of the PIC or VO.

Due to the contractual nature of the operations with private landowners, no other manned crop spraying operations will occur during UAS flight operations. Further, there are areas of airspace associated with the UAS operations where normal manned aircraft cannot fly. However, the PIC will remain clear and give way to any unexpected, manned aviation operations and will immediately land the UAs until the manned aircraft has exited the operations area.

In addition, signage announcing future spraying operations will be posted at the site entrance warning any customer employees or non-Participants that an aerial spraying operation is occurring. This is an industry standard process.

ALTITUDE RESTRICTIONS

Spraying operations will generally be conducted at an altitude of between 15-50 feet AGL but will never be higher than 100 feet AGL even during return to home or safety maneuvering. This vertical height limit is a set restriction in the software and cannot be exceeded or changed during flight. Flying at these low altitudes increases the aircraft's efficiency, without posing any increased risk to people or property.

SPEED RESTRICTIONS

During night-time operations, the aircraft will be operated at a reduced airspeed not exceeding 20 miles per hour or at an airspeed greater than the maximum operating airspeed recommended by the aircraft manufacturer, whichever is lower.

EMERGENCY PROCEDURES

The pre-programmed emergency procedures incorporate contingency plans that address emergency recovery or flight termination of the UAS in the event of unrecoverable system failure. These procedures will normally include Lost Link Points (LLP), Divert/Contingency Points (DCP) and Flight Termination Points (FTP) for each operation.

The PIC will immediately abort the flight operation if unexpected circumstances or emergencies arise that could degrade the safety of persons or property. The PIC will terminate flight operations without causing undue hazard to persons or property in the air or on the ground.

1. Lost Link

The lost-link safety default feature allows the UAS to automatically hover and land in response to a lost-link event. Safety features such as the GPS warning/indicator lights and speed indicator light provide critical system status information to the pilot.

The PIC will declare an emergency when any abnormal situation affects the safety of flight. If the PIC loses command or control link, the aircraft will follow a pre-determined route to either reestablish link or immediately recover or land.

2. Manual Control

If at any time there is a question that a UAS is no longer flying its programmed mission, the PIC will take manual control of the UAS and return it to the landing zone immediately under manual control. There may be minor problems that do not require emergency assumption of control. In these cases, the PIC can direct an autopilot landing or manually land the aircraft.

3. Lost Communications

Between the UAS and GCS

If there is a temporary loss of control of the UA due to a lost communication link with the GCS, the UAS will respond to the failsafe mode IAW design specifications established in the aircraft operator's manual. The PIC will perform the procedures identified in the Operations manual.

4. GPS Failure

If there is a GPS failure and the returning telemetry from the UAS indicates as such, the PIC will follow the procedures outlined in the aircraft operator's manual.

SAFETY MANAGEMENT APPROACH

The Safety Management System (SMS) is an organized approach to managing operational safety risks to assure that an acceptable level of safety is achieved and maintained. All UAS flight operations will be conducted in accordance with the safety management approach established in the SMS manual submitted separately. A SRM safety case addressing night-time UAS operations has also been prepared and submitted in accordance with FAA requirements.

APPENDIX B

Multiple Aircraft Operations

PURPOSE

Ohana Drone will operate no more than two (2) DJI Agras T-16 UASs for aerial agricultural vegetation control and management operations in remote (rural), agricultural operating environments in class G uncontrolled airspace throughout the United States. The following provides systems assessment with information pertaining to the operations along with strategic and tactical mitigations.

MULTI-UAS CONTROL

1. Multiple Aircraft Capability - The T-16 naturally provides different modes for flat ground, mountains, and orchards, to meet most operational needs. Up to five (5) aircraft can be controlled by a single remote controller simultaneously. This more than doubles the efficiency of Ohana Drone's planned ultimate goal of a single-piloted operation of no more than two (2) aircraft.

In order to safety implement that plan, initially, one or more visual observer(s) will be located at the ends of the field to assist the PIC in maintaining operational awareness.

Visual observers will be used for a minimum of 10 flight hours while assessing the efficacy of the software and the remote control.

2. Standard Procedures

Take Off and Landing Points of multiple UAS will be at least 40 ft apart. This is Software enforced. In addition, only one (1) UAS will take off and land at a time. Takeoff and landings will be staggered so that the pilot can focus on the drones actively taking off or landing.

No missions for any UAS will ever be assigned that will cause crossing of flight paths. Each UAS will be the closest UAS to its own mission area.

UAS RTL points will never be within 10 feet of each. This is to ensure that a collision on landing will not occur and it is also software enforced.

When using 2 or more UAS on the same field, they will start on similar sides of the field to avoid collision, but will always be at least 40 ft apart.

The PIC will maintain visual line of sight (VLOS) of all aircraft during flight operations. The PIC will be positioned on the field in a manner to allow for

the best visual vantage point on elevated terrain within the operations area to enable a clear view of each individual aircraft and the surrounding areas, at all times.

i. Two Way Communication

When the VO is required, the VO and the PIC will maintain effective two-way communication and will coordinate with one another to scan the airspace where the UAS are operating for any potential collision hazard and will both maintain operational awareness of the position of the UAs.

ii. Flight Termination

If the PIC is unable to maintain VLOS with a UA during flight, the entire flight operation will be terminated as soon as safely practicable.

3. Conspicuity

The T-16 has Long-range visible, high intensity LED lighting. All T-16 come with mounted navigation lights in a standard configuration to indicate orientation and health. DJI Agras offers high intensity LED lighting on the front three arms of the aircraft as well as aircraft status indicators on the rear three arms. Further, the use of high-visibility paint will be used on the aircraft to increase conspicuity in order to facilitate rapid identification of the UAs.

4. Restricted by Speed

During multiple operations, the T-16 will be operated at a reduced airspeed not exceeding 20 miles per hour or at an airspeed greater than the maximum operating airspeed recommended by the aircraft manufacturer, whichever is lower.

AIRCRAFT SAFETY FEATURES

1. Initial Airworthiness Review

All multiple UAS operations will be conducted in accordance with (IAW) the DJI AGRAS T-16, operating manuals. Aircraft will always be operated, in a flight ready condition, and aviation personnel are expected to utilize sound, conservative judgment in their approach to their duties.

In accordance with the statutory criteria provided in 14 CFR part 107, and in consideration of the size, weight, speed, and limited operating area associated with the aircraft and its operation, Ohana Drone expects no adverse safety affects to participating or nonparticipating individuals compared to a manned aircraft that holds a standard airworthiness certificate performing a similar operation.

Ohana Drone has an established inspection and maintenance program for the continued airworthiness of the aircraft in accordance with the manufacture's maintenance, overhaul, replacement, inspection and life limit requirements for the aircraft and aircraft components.

2. Reserve Power

The PIC is prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough available power for each aircraft involved in the operation to conduct the intended operation with sufficient reserve such that in the event of an emergency, the PIC can land the aircraft in a known area without posing an undue risk to aircraft or people and property on the ground. In the alternative, if the manufacturer's manual, specifications, or other documents that apply to operation recommend a specific volume of reserve power, the PIC will adhere to the manufacturer's recommendation, as long as it allows the aircraft to conduct the operation with sufficient reserve and maintain power to land the aircraft in a known area without presenting undue risks, should an emergency arise.

3. Redundant Flight Controls and Safety Features

The DJI AGRAS T-16 has onboard safety features to ensure the UAS can operate safely under both normal and emergency operating conditions. These features include automation to increase safety and reduce pilot workload. Some examples are the self-monitoring function (pre-takeoff diagnostics), a high-precision altitude control system, and redundant GPS flight control systems with geo-fencing and active obstacle avoidance.

The lost-link safety default feature allows the DJI AGRAS T-16 to automatically hover and land in response to a lost-link event. Safety features such as the GPS warning/indicator lights and speed indicator light provide critical system status information to the pilot.

If the PIC loses command or control link for a designated length of time, the aircraft will follow a predetermined route to finish the mission, reestablish link, or immediately return to land if the first two options are not possible. The UAS will automatically return when for low battery, or fluid in the tank, even when the link is lost. To ensure operational safety, this feature is optional and can be turned on/off. All safety features including automatic obstacle detection and avoidance remain in effect in the event of a lost link.

The following is an additional list of standard safety features of the DJI Agras T-16 which Ohana Drone will utilize as part of their multiple aircraft operations.

a. Onboard Radar - The T-16's upgraded radar system can sense the operating environment during the day or at night, without being affected by light or dust. It has greatly improved flight safety with forward and backward obstacle avoidance and a horizontal FOV (field of view) of 100°. It can also detect the angle of a slope and adjust to it automatically even in mountainous terrain. This innovative radar system adopts Digital Beam Forming (DBF) technology, which supports 3D point cloud imaging that effectively senses the environment and helps to circumvent obstacles. This includes the other aircraft being flown in the operation.

b. Signal Redundancies - The all-new modular aerial-electronics system in the T-16 has dual IMUs and barometers and adopts a propulsion signal redundancy design to ensure flight safety. The GNSS+RTK dual-redundancy system supports centimeter-level positioning. It also supports dual-antenna technology that provides strong resistance against magnetic interference.

c. Rotor Fail Protection - If one rotor fails, the flight controller will compensate for lost rotor and will notify operator via on-screen warnings; aircraft maintains stability allowing operator to safely land. In the event of a rotor fail warning, the PIC will implement Return to launch (RTL) protocols and address the malfunction to ensure the aircraft is in a flight ready condition before launching again.

The RTL feature allows the operator to instantly stop the UA and return it to the base point at a pre-programmed safe height. In addition, the T-16 has an emergency "Kill Switch" if needed which allows the operator to instantly stop motors in the event of an emergency.

Also, in the event that the original "home" location is no longer safe to return to, the PIC can execute a command to immediately, and

automatically land the aircraft at its current location.

d. Geofencing and Obstacle avoidance - The UA's flight controller is given GPS coordinates of a boundary that it cannot leave, keeping the UA from leaving the pre-determined and defined operations area. This is especially useful in multiple aircraft operations, because when enabled, the UA can "hit" the perimeter, but not fly past or through it, therefore separating each aircraft by containing them within their own operations area. This is a perimeter that the drone will not fly outside of.

In addition, the T-16 has its own priority system for determining which aircraft have the right of way and in the event of a conflict, the onboard radar engages, and all aircraft will stop in place and hover.

Second, for an obstacle, such as the other aircraft, a purposeful obstacle boundary can be established. This means that the aircraft will build its flight plan and avoid that obstacle. Further, the operator can specify how large of a buffer they would like to keep between the aircraft and that obstacle.

Further safety is ensured by complying with the manufacturer's recommended field marking.

As a reminder, if there was ever a time where a non-participant person or property entered the planned flight area, the operator could immediately halt the operation by one or all of the aircraft by activating the emergency "kill switch" to immediately stop the rotors or may press a switch to activate the emergency return to home feature.

e. RTK GPS - The T-16 has a telemetry link to a base station which makes GPS corrections, giving the UA an accurate location reading with under 3 feet of precision. (Typically, 50cm). This ensures that the UA is flying the missions it is given.

Should a telemetry link to the base station be lost, the UA has all mission parameters stored onboard, and can safely continue to

execute a mission. If the RTK link is dropped, the positioning accuracy may drop to around 2m accuracy. Audio alerts on the RC remote and base station computer will alert the PIC, who may opt to allow the UA to continue its mission if it is safe to do so or interrupt the mission and bring the UA back under RC control.

f. Redundant GPS- All T-16s are equipped with redundant GPS units. Should the primary GPS unit experience a failure, a second GPS unit will automatically takeover as a failsafe to ensure accurate positioning and navigation is maintained. Full dual redundancy. Automatic switching in real-time between compass, IMU, GPS or controller if one fails.

The T-16 also uses GPS and IMU data to determine when the craft is fully on the ground, meaning the aircraft will not shut rotors off until firmly on the ground. The T-16 also uses IMU data to safely and smoothly handle “In Ground Effect” caused by the rotor downwash, which lessens stress and accident likelihood for operator.

g. RC control - All missions occur with pre-programmed commands providing instructions to the UA. At all times, a PIC has an RC remote with the ability to override the current mission. Should the RC connection be lost, the autopilot software will immediately end the mission and return the UA to the home launch location. In this case, the UA ascends to a height set by the PIC in advance of the mission and determined to be safe given the surrounding terrain, normally 30-40 feet. The UA then returns in a straight line to the launch location. The PIC may choose to resume or alter the mission if an RC link is established again while the UA returns home.

h. Flight Stall Prevention: Flight controller prevents accidental 'throttle zero' motor stall while in the air. In an emergency, operator can switch instantly to 'manual' mode to activate rotor kill, providing complete system override by the pilot during an in-flight emergency.

SITE SELECTION

Operations will occur in a closed access environment over rural uninhabited, unoccupied, private or restricted-access land. These operating areas will always be owned or managed by the person or entity that is contracting with Ohana Drone to perform the aerial application and will be planned and approved in advance of the mission.

Due to the contractual nature of the operations with private landowners, no other manned crop spraying operations will occur during UAS flight operations. Further, there are areas of airspace associated with the UAS operations where normal manned aircraft cannot fly. However, the PIC will remain clear and give way to any unexpected manned aviation operations and will immediately land the UAs until the manned aircraft has exited the operations area.

1. Controlled Access

Operations will occur under strictly controlled conditions in predetermined class G airspace that is, 1) Limited in scope 2) Controlled as to access by mission essential personnel only. Ohana Drone will be flying over uninhabited farmland that they own, or uninhabited farmland they are contractually hired to spray. By contractual operations in concert with landowners, Ohana Drone can ensure that the property will remain clear during spray operations. In addition, signage announcing future spraying operations will be posted at the site entrance warning any customer employees or non-Participants that an aerial spraying operation is occurring. This is an industry standard process.

2. Altitude Restrictions

Spraying operations will generally be conducted at an altitude of between 15-25 feet AGL but will never be higher than 100 feet AGL even during return to home or safety maneuvering. This vertical height limit is a set restriction in the software and cannot be exceeded or changed during flight. Flying at these low altitudes increases the aircraft's efficiency, without posing any increased risk to people or property.

EMERGENCY PROCEDURES

The pre-programmed emergency procedures incorporate contingency

plans that address emergency recovery or flight termination of the UAS in the event of unrecoverable system failure. These procedures will normally include Lost Link Points (LLP), Divert/Contingency Points (DCP) and Flight Termination Points (FTP) for each operation.

Specifically, during multiple aircraft operations, the PIC will immediately abort the flight operation if unexpected circumstances or emergencies arise that could degrade the safety of persons or property.

In the highly unlikely event of a flyaway, The PIC will immediately initiate RTH protocol or land the second aircraft without causing undue hazard to persons or property in the air or on the ground. At the same time, the PIC will immediately terminate flight operations of the flyaway aircraft without causing undue hazard to persons or property in the air or on the ground.

The Failsafe RTH is automatically activated if the remote controller signal is lost for more than three seconds, provided that the home point has been successfully recorded, the GNSS signal is strong (the white GNSS icon), and the RTK module is able to measure the heading of the aircraft. The RTH continues if the remote controller signal is recovered, and the pilot can control the aircraft using the remote controller.

1. Lost Link

The lost-link safety default feature allows the UAS to automatically hover and land in response to a lost-link event. Safety features such as the GPS warning/indicator lights and speed indicator light provide critical system status information to the pilot. The Failsafe RTH feature is automatically activated if the remote controller signal is lost for more than three seconds.

The PIC will declare an emergency when any abnormal situation affects the safety of flight. If the PIC loses command or control link, the aircraft will automatically follow its pre-determined route to either reestablish link or immediately recover or land.

2. Manual Control

If at any time there is a question that a UAS is no longer flying its programmed mission, the PIC will take manual control of the UAS and return it to the landing zone immediately under manual control. There may

be minor problems that do not require emergency assumption of control. In these cases, the PIC can direct an autopilot landing or manually land the aircraft.

3. Lost Communications

Between the UAS and GCS

If there is a temporary loss of control of the UAs due to a lost communication link with the GCS, the UAS will respond to the failsafe mode IAW design specifications established in the aircraft operator's manual. The PIC will perform the procedures identified in the Operations manual.

4. GPS Failure

If there is a GPS failure and the returning telemetry from the UAS indicates as such, the PIC will follow the procedures outlined in the aircraft operator's manual.

SAFETY MANAGEMENT APPROACH

The Safety Management System (SMS) is an organized approach to managing operational safety risks to assure that an acceptable level of safety is achieved and maintained. All UAS flight operations will be conducted in accordance with the safety management approach established in the SMS manual submitted separately. A SRM safety case addressing multiple UAS operations has also been prepared and submitted in accordance with FAA requirements.